Using The Cow Instead Of The Plow

A Management Option On Former CRP Land In The Southern Great Plains

by

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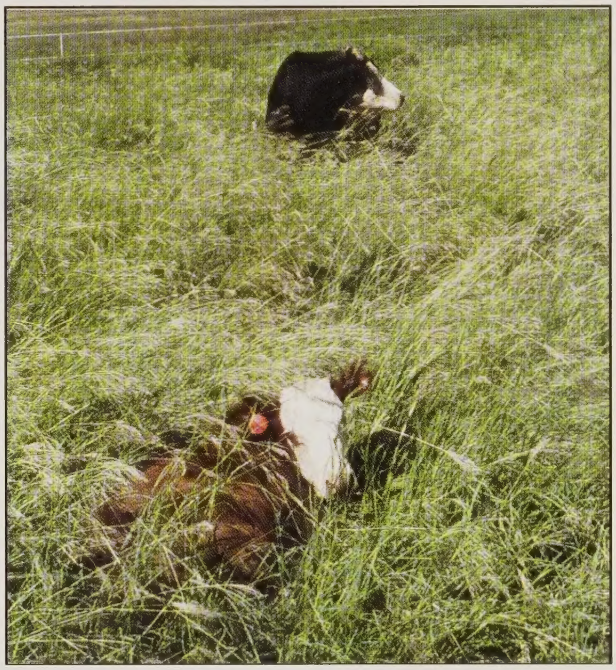
Since 1986, more than 36 million acres of cropland have been retired from production through the Conservation Reserve Program (CRP). In 1997, a large number of the original CRP contracts expired and many of those were not accepted in the new CRP enrollment. To derive income from that land, producers will have to choose between converting it back to crops or using the existing grass for forage, either by grazing or haying.

A large percentage of CRP acreage in the southern Great Plains consists of monocultures, or single-species plantings, of introduced grasses. Though there is also a significant amount of acreage planted to native grass mixtures, the monocultures of Old World bluestem and weeping lovegrass have raised the most questions from producers about grazing management. The purpose of this pamphlet is to discuss some of those questions and provide guidelines for grazing management of Old World bluestem and weeping lovegrass.

Old World Bluestem

Yellow bluestem *(Bothriochloa ischaemum)* and Caucasian bluestem *(Bothriochloa caucasica)* are perennial, warm-season, bunchgrasses introduced into the United States in the early 1900s from Asia and Eastern Europe. From the time of introduction, plant breeders have worked to develop improved varieties for greater forage production, cold tolerance, and disease resistance. Old World bluestem is the generic term used in reference to the numerous cultivated varieties. Among the more popular varieties are "King Ranch," "Plains" "WW-Spar," "WW-Ironmaster" "WW-B. Dahl," "Ganada," and "Caucasian."

Old World bluestems (OWB) are easily established, vigorous, drought-tolerant plants that readily spread by seed once established. They grow best on medium-textured, well-drained soils and will not tolerate long-term saturation or saline conditions. They are best adapted to areas on the Great Plains receiving between 15 and 35 inches of annual rainfall and are limited to the southern Great Plains due to cold intolerance. Old World bluestems begin to green up about the same time as native bluestems and are ready to be grazed by late May or early June. Forage production of OWB can range from 1,200 to more than 10,000 lb/acre, depending on soil, fertilization, rainfall, and variety. Old World bluestems have a high degree of grazing tolerance and water use efficiency, making them well suited for intensive grazing or haying.



Because of their high production level, OWB should be used in intensively managed, rotational grazing systems. Rotational grazing will encourage more uniform forage utilization and help maintain forage quality (nutritive value) at a higher level. Grazing or haying of OWB should be deferred for four to six weeks prior to first frost so the plants can build root reserves before the onset of winter. After the first killing frost, the accumulated growth can be utilized as winter pasture or hay.

Weeping Lovegrass

Weeping lovegrass *(Eragrostis curvula)* is a perennial, warm-season bunchgrass introduced into the United States from Africa in the late

1920s for use in erosion control. Several cultivated varieties of weeping lovegrass (WL) have been developed with improved forage production and palatability characteristics over the original species. “Ermelo” and “Morpa” are two popular cultivated varieties.

Weeping lovegrass is adapted to a wide range of soils and precipitation zones, but grows best on coarse-textured, well-drained soils where annual rainfall exceeds 15 inches and winters are relatively mild. Although WL is more cold-tolerant than other lovegrasses, winter temperatures limit its growth primarily to the southern Great Plains in Texas, New Mexico and Oklahoma. Weeping lovegrass starts its growth earlier in spring than most other warm-season grasses, and can be ready for grazing by as much as four to six weeks before OWB. This makes WL useful in “bridging the gap” between winter and summer forages. This characteristic, combined with the ability to produce large amounts of forage under dryland conditions, makes WL an excellent choice for use in complementary forage systems.

As with OWB, weeping lovegrass is best used in rotational grazing systems and should be deferred from grazing or haying four to six weeks before first frost.

Renovation of Old Grass Stands

Grass stands coming out of CRP will be at least 10 years old and may not have been grazed, hayed, or burned during that time. These stands will have accumulated large amounts of old, decadent vegetation that covers the base of the plants, decreasing plant production and limiting forage availability to livestock. In extreme cases, the stand may even be dying out. Before these stagnant grass stands can be grazed effectively, renovation will be necessary to stimulate new vegetative and reproductive growth, increase forage availability to livestock, and improve forage quality.

Removal of Old Growth

The first step in renovation is removal of the old vegetation. Though mowing would stimulate some new growth, it is not the most effective renovation method because it does not remove old vegetation. The old growth is merely chopped and redistributed, covering the plants and blocking sunlight while preventing seeds from contacting the soil. A more effective alternative would be haying. Cutting and baling hay would remove old growth, which would allow sunlight to reach the base of the plants and the soil surface, stimulating new plant growth. The hay would be low in quality, but could be used as a mulch on bare or eroded areas or for other non-feed purposes such as animal bedding.

Another option would be to winter a herd of dry cows on the pasture to trample and/or remove the old vegetation. This would require a relatively high stock density (number of animals per unit of land at a point in time) in addition to substantial amounts of protein and mineral supplementation for the animals. Even with supplementation, animal performance might suffer, and the costs of supplementation and animal weight loss may make this alternative economically undesirable.

In many cases, the best method for renovating a stagnant grass stand is prescribed burning.

When carried out according to plan, burning is a safe, quick, economical method of removing vegetation. In addition, burning releases phosphorous and potassium from old vegetation, temporarily increasing quality in subsequent regrowth. While grass production can be reduced by as much as 16% the summer following a bum, experience has shown that the increase in forage quality compensates for the decreased quantity, and animal performance is not reduced.

Burns should be conducted in early spring, just prior to green up. This minimizes the length of time the soil is without vegetative cover, which conserves moisture and reduces the possibility of a significant amount of soil erosion occurring. An important consideration prior to conducting any prescribed burn is soil moisture. If the soil is dry and/or the area in question is currently experiencing drought conditions, the burn should be postponed until conditions are more favorable. This could mean waiting until the next year or using a different method of removal. Burning under extremely dry conditions increases the possibility of damage to plant root crowns during the burn, it slows or reduces plant response after a burn, and it increases the possibility of severe soil erosion, particularly on sandy soils in areas subject to high winds.

A burn plan should be prepared before conducting any prescribed burn. Factors to be included in a burn plan are weather conditions, direction of burn, location of highways, buildings, and other structures, fuel and equipment requirements, and emergency phone numbers. Prescribed burns should be directed away from highways, populated areas, or other places where smoke could be hazardous. Optimal weather conditions for a prescribed burn include wind speed between 5 and 15 mph, relative humidity of 20 to 60 percent, and temperature between 45^0 and 70^0 F. One or more conditions under which prescribed burns should <u>not</u> be conducted include wind speed greater than 15 mph, relative humidity less than 20%, temperature over 80^0 F, or a frontal system expected to pass within 12 hours of planned burn time. In addition, there may be local ordinances against burning, and these should be considered before striking the first match.

Cost of a burn is a function of size, shape, and topography of the pasture, and length and number of fireguards that have to be prepared. Larger acreages, complex pasture shapes, and rough topography increase manpower requirements, thus increasing total cost. Cost per acre, however, decreases as burn size increases. Some actual costs of a grassland bum in Oklahoma are shown in Table 1.

Table 1 Burning Cost on Grassland Waurika Division, Stuart Ranch 1996	
Item	**Cost**
Fuel (drip torch, fire truck, tractor, pickups, 4-wheeler, sprayers)	**$225.50**
Diesel: 180 gal @ $0.69/gal	
Gasoline: 80 gal @ $0.97/gal	
Propane: 30 gal @ $0.79/gal	
Labor for Fireguard Preparation (disking)	**$250.00**
1 man for 5 days @ $50.00/day	
Labor for Actual Burn (8 people for 1 day)	**$694.00**
Total Cost	**$1,169.50**
Total Acres Burned	**5,000**
Total Cost per Acre	**$0.23**

Fertilization

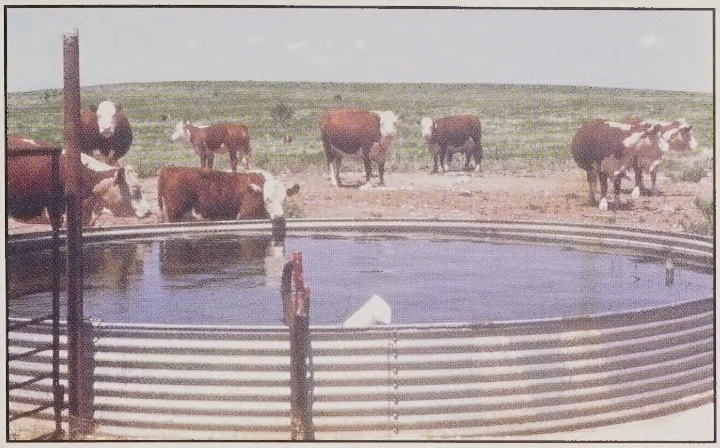
After the old vegetation has been removed, fertilizer should be applied to enhance both forage quantity and quality. Old World bluestem and weeping lovegrass are efficient users of fertilizer, even under dryland conditions. They will produce significantly more forage when fertilized, particularly on the nutrient-depleted soils typical of most CRP lands. Dry fertilizer is generally more convenient to apply, with 30 to 60 pounds actual nitrogen per acre commonly used in dryland situations. On OWB pastures in areas receiving less than 25 inches of annual rainfall, a single nitrogen fertilizer application in April usually results in more forage production than split applications in April and June. Split applications, however, are recommended for OWB in areas receiving greater than 25 inches annual rainfall and for all WL pastures, regardless of average annual rainfall. Phosphorous and potassium are also important nutrients and a soil test should be conducted to determine the quantity of these needed.

Fencing & Water Development

Fencing

Because they are former croplands, many CRP fields may not be fenced and will require fencing development before they can be grazed. Fencing costs will vary depending upon type of fence and amount installed. In general, barbed wire fence will cost from $0.65 to $1.25 per foot depending on number of strands, type of posts, labor costs, etc. Electric fence is less costly initially at $0.15 to $0.35 per foot, but maintenance costs will probably be higher than for barbed wire. Regardless of fence type, fencing cost per acre decreases as tract size increases.

Water



Watering points may already exist on some CRP lands or in adjacent tracts and can be utilized at a minimal cost. However, many tracts may require the development of water. In planning water development for grazing animals, it is important to ensure that sufficient water will be available daily for the number of animals present. While animal weight gains are directly related to the quantity and nutritive value of feed consumed, feed consumption and weight gain will be reduced by inadequate water intake. Normally, mature cows will consume between 10 and 20 gallons of water per day, depending on cow size and physiological stage, forage quality and growth stage, and environmental factors. Steers or heifers weighing 600 pounds will need between 6 and 12 gallons per day. Pumps and watering troughs should be capable of providing enough water in a two-hour period for all animals in a given pasture, with enough reserve storage for a two to three day supply in case of a pump or well breakdown.

A standard electrical pump on a good well will be able to meet the water requirements of grazing livestock in most situations. Windmills or solar pumps can be used where electrical lines are not available, but pumping capacity of these is a limiting factor, particularly on tame pastures that can have a much higher animal carrying capacity than adjacent native rangeland. If water well or pipeline development is not possible, it may be necessary to haul water to the pasture. The main consideration in this case is to install a large enough tank to supply the cattle with adequate water between haulings.

Determining Stocking Rate

Before any grazing enterprise is started, proper stocking rate should be determined. Stocking rate, expressed as number of animals per unit of land per unit of time (or units of land per animal per unit of time), is the single most important factor to consider in grazing management. If stocking rate is too low, forage will not be utilized effectively, and the comparatively low number of animals may make the grazing enterprise economically unfeasible. If stocking rate is too high, the forage plants will be grazed too heavily, decreasing their vigor and production, which in the long-term will decrease animal production, again making the grazing enterprise economically unfeasible. Proper stocking rate falls somewhere in the middle and enables the plants to maintain their vigor while allowing enough animal production to hopefully make the venture profitable.

Stocking rates on OWB and WL will vary depending on forage production, grazing system, and management level. Forage production is largely a function of rainfall but can be enhanced by management practices such as timely application of proper amounts of fertilizer. Type of grazing system is also a management decision and affects stocking rate by affecting stock density. Multi-pasture, rotational grazing systems have higher stock densities than single-pasture,

continuous grazing systems of the same acreage. Since higher stock densities result in greater harvest efficiency, a greater percentage of the forage is utilized, which can enable rotational systems to have an increased stocking rate over continuous systems. Harvest efficiency (H.E.) is the percentage of total forage production consumed by the grazing animals. On native rangeland under proper grazing use, the rule of thumb for harvest efficiency is 25%. On intensively managed tame pastures, however, higher harvest efficiencies can be obtained because of the uniformity of vegetation and generally smaller pastures with higher stock densities. A harvest efficiency of between 35% and 50% can usually be expected on OWB and WL pastures in rotational grazing systems.

Table 2
Stocking Rate Examples

Body Weight	Pound Graze/Day	Graze Day	Pound Production/Acre	H.E.	Pound Available/ Acre	Acre/Head/ Graze Season
*450	16.2	120	1500	35%	525	3.70
1100	33.0	120	1500	35%	525	7.54
*450	16.2	120	2500	35%	875	2.22
1100	33.0	120	2500	35%	875	4.53
*450	16.2	120	6000	35%	2100	0.93
1100	33.0	120	6000	35%	2100	1.89

*These examples compensate for the stockers' growth through the graze season by averaging their starting and expected ending weights. Assuming a weight gain of 1.5 pounds per day for 120 days: (450 lb + 450 lb + (1.5 lb/day x 120 days)) -, 2 = 540 lb. average. Then 540 lb x 3% per day = 16.2 lb dry matter consumed per day.

To calculate proper stocking rate, forage supply and forage demand through the proposed graze season must be determined. One method of determining supply is to clip, dry, and weigh samples of standing forage produced during the same time of year as the proposed graze season.

Of course, this would have to have been done last year to be of use in setting stocking rate for the current year. Another method is to simply use known past production figures from a location similar to the one being planned. Whatever method is used, the grazing manager should understand that forage production will vary from year to year with rainfall, and that stocking rate will need to be adjusted to match current forage supply.

Forage demand can be determined by size of the animals, but will vary depending on forage quality, animal physiological stage, and environmental conditions. A widely used figure for daily forage consumption (dry matter) by cattle is 2.6% of body weight. Keep in mind, however, that this is an average figure and that forage intake of brood cows can vary from less than 2% while non-lactating to greater than 3% during peak lactation. Also, growing animals may consume as much as 3% of their body weight. When estimating forage demand, the specific class of animals should be considered in addition to body weight.

Once forage supply and forage demand have been determined, stocking rate can be calculated as in the following equation:

(Body Wt x .026 x Graze Days) -, (Lb Forage Produced per Ac x H.E.) = Ac/Head/Graze Season To use this equation, enter the appropriate harvest efficiency value for the management system being planned, and if necessary, replace .026 with the appropriate value for the specific class of animals that will be grazing. Some examples for stocker steers and lactating cows are shown in Table 2 using 3.0% of body weight and 35% harvest efficiency.

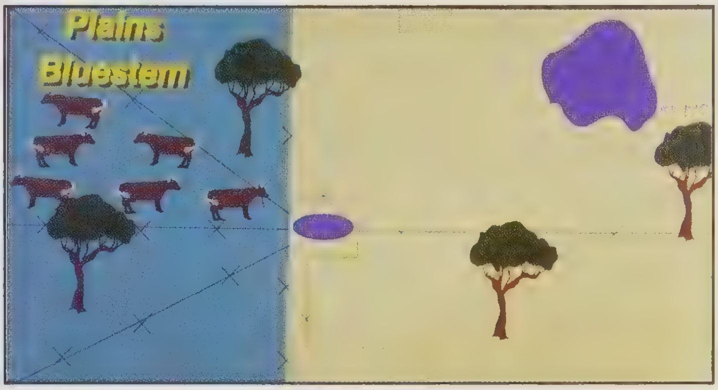
In addition to forage demand fluctuating with changing size or physiological stage of the animals, forage supply fluctuates with changing plant physiological stage and environmental conditions. This means that determining initial stocking rate using the above method is only a starting point and that maintaining proper stocking rate is an ongoing process. Condition of the grass and animals should be continually monitored so adjustments can be made to match forage demand with forage supply. This will assure optimum use of the forage and maximum benefit to the animals.

Grazing Management

Complementary Forage Systems

A complementary forage system is a set of pastures consisting of different forage types that are utilized at different times of the year. Tame pastures of OWB and WL are well suited for use in complementary systems which have rangeland or small-grains pasture available for part of the year. For example, in shortgrass country of the western Great Plains, grazing OWB or WL pastures during summer and rangeland during winter takes advantage of the high summer production of OWB and WL and relatively high winter quality of shortgrass rangeland. Benefits with this type of system are that a higher quality and quantity of forage is available to cattle year-round, the different forage types are rested from grazing for part of the year, and the potential for range improvement exists due to grazing deferment during the growing season. Another example would be to combine grazing dormant OWB or WL with adjacent winter wheat pasture. Providing access to wheat will increase overall diet quality and enhance utilization of the relatively low quality, dormant OWB or WL with little or no supplementation.

Rotational Grazing



In conjunction with use in complementary forage systems, the most effective grazing strategy for OWB and WL is rotational grazing. Rotational grazing is a multi-pasture system in which graze periods for individual pastures are followed by rest periods. Continuous grazing in a large, undivided pasture will result in uneven grazing and lower harvest efficiency. Dividing a single, large pasture into several smaller ones concentrates animals into a smaller area and facilitates more even, more efficient forage utilization. In addition, it allows plants in the other pastures an opportunity to recover from grazing, which helps maintain a healthy stand of grass. The number of pastures in such a system can vary from two to several, depending on size of the original pasture and objectives of the manager. Generally, four to six pastures of 40 to 60 acres each is considered optimal for OWB or WL in a rotational system.

Length of graze period for each pasture is determined by pasture size, number of pastures, and forage growth rate. Pasture size is determined when subdividing the total acreage. At any given stocking rate, smaller pasture size will mean shorter graze periods, and for any given total acreage, smaller pasture size will mean more

pastures. The greater the number of pastures, the shorter the graze period must be in order to graze all the pastures in a given length of time. As for forage growth rate, the rule of thumb is that as growth rate increases, rotation rate through the pastures should increase. This shortens the rest period, which prevents forage in the rested pastures from becoming mature and rank, and helps keep all the pastures more uniformly grazed. Growth rate of OWB and WL is slow when the plants first begin to green up. It then increases through spring, reaches its peak in late spring or early summer, and finally tapers off through the remainder of summer.

Graze periods may be as short as one to two days during peak forage growth. With a six- pasture system, a graze period of one day would mean a rest period of only five days for any given pasture before cattle are in that pasture again. Obviously, a high rate of growth is necessary for such a rapid rotation. But moving cattle quickly through the pastures during peak forage growth captures the highest quality forage from each pasture before it has time to mature and decrease in nutritive value. Graze periods usually should not exceed six to seven days in a typical tame pasture rotation system or animal performance may suffer due to lower forage quality. Cattle will graze the youngest, most nutritious plant parts first, and then consume progressively older, lower quality forage. Therefore, the longer cattle remain in one pasture, the lower their diet quality becomes. In conjunction with this, the longer cattle are in one pasture, the older and lower in quality the forage in the other pastures becomes. This makes managing a rotational grazing system a balancing act between utilizing the highest quality of forage overall and harvesting the greatest quantity of forage in any given pasture. Rate of rotation through the pastures will determine the balance. However, condition of the grass and animals should be monitored throughout the grazing season, and decisions to move should be based on observation rather than on a fixed calendar schedule.

The average grazed height of OWB or WL pastures should be kept above four inches during active plant growth. Plant heights under four inches would indicate overstocking and animal numbers would need to be reduced to prevent damage to the grass stand. Animals should be removed from OWB and WL pastures four to six weeks before first frost to allow the plants time to build root reserves going into winter. After the first killing frost, the accumulated growth can be grazed, though a stubble height of a few inches should be left to help prevent freeze damage to the plants.

If the pastures are not grazed during winter and a substantial amount of growth accumulated before frost, the old growth should be removed to a uniform height before spring so the plants will have uniform palatability after green up.

Table 3
Steer Weight Gains on Old World bluestem
Woodward, Oklahoma

Forage Growth Stage **Time of Year**	**Dormant** **Dec-Mar**	**Growing** **Apr-Sep**	**Both** **Dec-Sep**
Average Daily Gain (lb/steer)	0.4	1.7	1.2
Average Seasonal Gain (lb/steer)	42.0	220.0	260.0
Average Total Gain (lb/acre)	30.0	150.0	180.0
Stocking Rate (ac/steer/yr)	1.5	2.0	1.7

Though not as critical as with renovation of old stands, mature forage removal will help prevent spot grazing. Removal can be accomplished by grazing, mowing, or in areas that receive abundant rainfall, by burning. If grazing is used, remember that supplemental protein will probably be needed.

Animal Performance

Cattle weight gains on OWB and WL will vary according to precipitation and fertilization, but should average between 1.50 and 1.75 pounds per head per day for growing animals on summer pasture. Gains will be greatest during the early part of the growing season due to higher forage quality. Steer gains as high as 2.5 pounds per head per day can be obtained for a short time when forage quality is highest. Quality of WL will peak in early to mid-May and rapidly decline as the plants become coarse and less palatable. Quality of OWB will peak around mid-June and though its decline will not be as severe as that of WL, it can drop below recommended levels for growing cattle by mid-July. Quality of both will continue to decline through the remainder of the growing season. Crude protein is usually the limiting nutrient in late-growing-season forage, and is best provided through high-protein feedstuffs such as cottonseed meal, soybean meal, or high-protein range cubes or liquid. Grain, such as corn or milo, is not recommended for use as a protein supplement since it suppresses forage intake, which is counter productive in a grazing program.

Under average conditions, steer gains of 150 pounds per acre can be expected during the growing season. The results of a 10-year study of steers grazing OWB at the USDA-ARS Southern Plains Range Research Station in Woodward, Okla. are shown in Table 3.

The most effective time for grazing OWB and WL is during the growing season. Dormant season grazing of OWB and WL should probably be limited to mature animals such as dry, pregnant cows. These animals have a lower nutrient requirement, and the primary management objective for them is weight maintenance rather than weight gain. Even with mature animals, protein supplement might be necessary to meet nutrient requirements during the dormant season.

Table 4
Comparison Of Returns To Grazing OWB Versus Growing Crops In Carson County, Texas

	Crop		*Grazing Intensity*	
Year	**Wheat**	**Sorghum**	**High**	**Low**
1993	$27.74	$58.16	$30.03	$21.65
1994	6.40	-9.85	17.81	18.17
1995	-9.69	-27.98	7.56	9.40
Average	**8.15**	**6.78**	**18.47**	**16.41**

Grazing vs. Crop Production

The decision of whether to graze former CRP land or return it to crop production will probably be a matter of economics. A three-year study in Carson County, Texas compared two grazing intensities on OWB pastures to continuous wheat and continuous sorghum dryland cropping. Dollar returns per acre for each system are shown in Table 4.

Rainfall amounts from May through August for the three years of this study were 94%, 57%, and 64% of the prior 20-year average, respectively. Since fluctuations in rainfall and frequent periods of drought are common occurrences in the southern Great Plains, this study should reflect real life scenarios. Conclusions from this study were: 1) Returns to land from grazing OWB-established on CRP land are competitive with traditional dryland cropping alternatives in the Texas Panhandle; 2) Cropping wheat or sorghum yields greater returns than grazing when precipitation is adequate; 3) Grazing yields greater returns than cropping wheat or sorghum when rainfall is limited; 4) Grazing can take advantage of forage produced even during drought that makes crop production impractical; 5) Returns from grazing OWB are more stable than returns from cropping systems; and 6) Grazing provides a lower risk option that can be combined with cropping systems to help stabilize income.

Summary

A large portion of former CRP land in the southern Great Plains consists of Old World bluestem and weeping lovegrass monocultures. Under proper management, these grass stands can be grazed profitably, avoiding the need to convert them back to cultivation. Tame pasture management is devoted to maintaining a high quality, high quantity, monoculture forage. This involves the use of fertilizers and herbicides, which means that tame pastures must be used intensively to recover the costs associated with intensive inputs. In contrast, rangeland management is oriented toward maintaining or improving abundance and persistence of desirable species in a stand that can include grasses, forbs, shrubs, and trees. This is accomplished mainly through grazing management with only limited use of fire, herbicides, and mechanical treatments, and practically no use of fertilizer. For managers accustomed to low-input rangeland management, the greatest obstacle to overcome for successful use of tame pastures is adopting the mind-set of intensive management. The successful use of Old World bluestem or weeping lovegrass will require intensive inputs in the form of capital and labor, followed by intensive use in the form of grazing or haying.

Each situation will have its own unique set of problems and available resources. Grazing managers should tailor their individual systems to meet specific conditions and objectives. The guidelines discussed here provide the foundation for establishment of successful grazing programs on Old World bluestem or weeping lovegrass pastures. Time and experience will show the observant manager what works best for him or her.

For further assistance developing a grazing plan on former CRP land or for help with other grazing land management problems, contact your local Natural Resources Conservation Service Center office.

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